Top questions in iPS cell research

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Every once in a while CIRM grantee Paul Knoepfler at UC Davis posts an update on his blog about what he considers to be the big ticket question in research using reprogrammed adult cells, known as iPS cells. This time, he's posted five questions for the upcoming year.

1. Will any new methods for creating iPS cells be truly transformative in the coming year? On this one, he urges patience with the apparent lack of visible progress. We've blogged here about the glacial speed and incremental nature of research.
2. Will transdifferentiation make iPS cells obsolete? More and more papers are coming out about directly converting one type of cell into another, skipping the slow step of creating iPS cells. On this topic Knoepfler says, "I personally think transdifferentiation has enormous potential, but I'm betting that for some areas, for generating some types of differentiated cells, iPS cells are going to be needed."
3. Are the various differences between embryonic stem cells and iPS cells going to be a concern? Yes, he says, but, "It seems likely that at least some of the mutations and differences will have functional meaning, but a key area in the coming year will be mapping out the meaning of these differences."
4. What's the best way of making better cells, rather than more cells? In the past, new methods of generating iPS cells focused on making the cells in higher numbers. Knoepfler argues that making better cells-cells with fewer abnormalities-is more important than making more cells.
5. How tumorigenic are iPS cells? As a cancer survivor and tumor biologist, Knoepfler has a personal interest in this question. He argues that studying whether or not iPS cells themselves cause tumors is irrelevant, because nobody is ever going to inject iPS cells into a patient. What scientists hope to do is convert those iPS cells into a therapeutically useful cell type (insulin-producing cell, neuron progenitor, skin cell) and transplant THAT cell to a patient. So the question isn't whether the iPS cells forms tumors. The question is whether these more mature cell types can form tumors.

It'll be interesting to see where these questions stand a year from now.

A.A.

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